

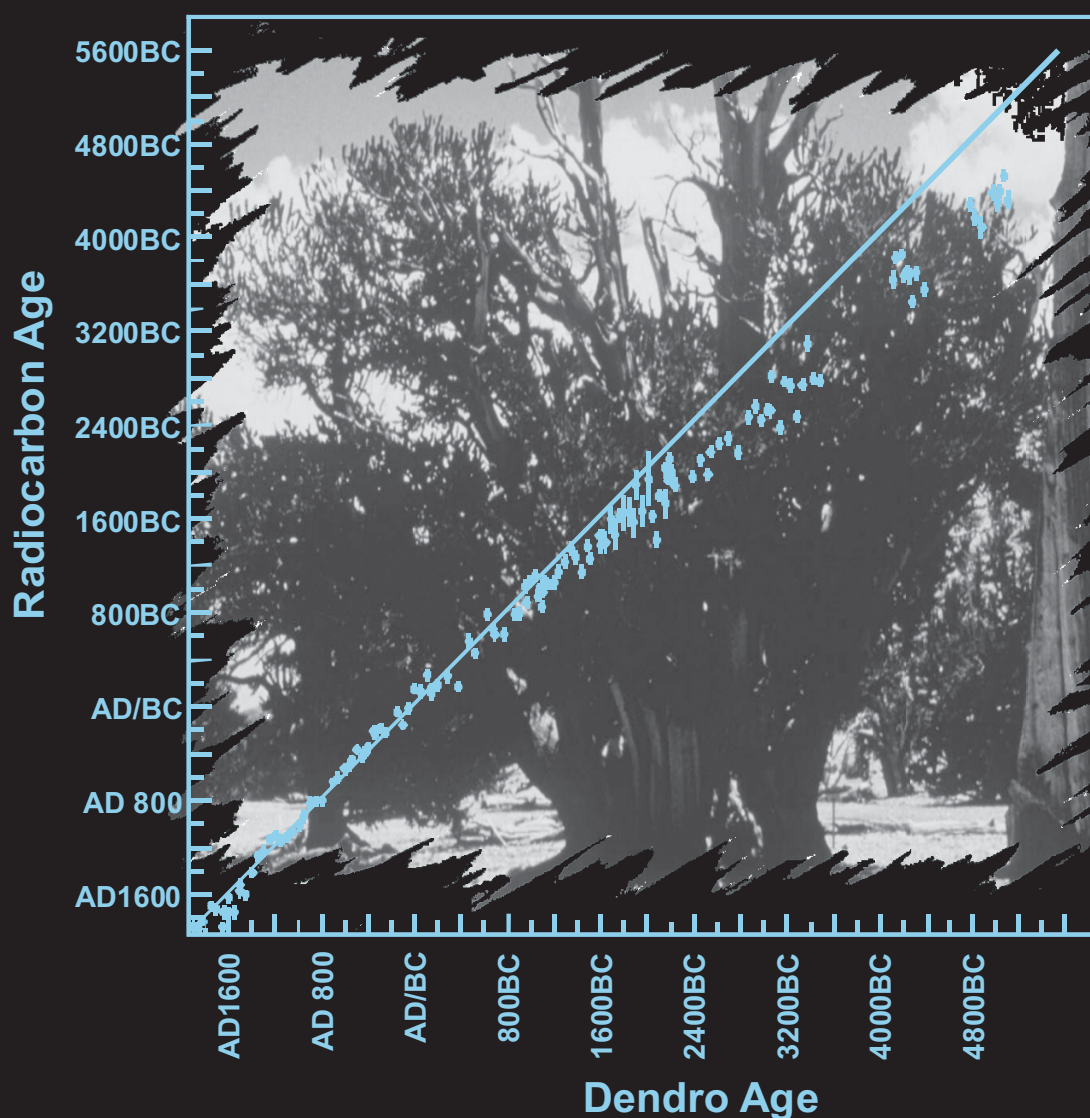
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NIST

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¹At Boulder, CO 80303

²Some elements at Boulder, CO

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Cover: The plot in the foreground represents an early version of the dendrochronological radiocarbon dating calibration curve, showing deviations from the ^{14}C age based on the nuclear half-life. Calibration of the natural variations of radiocarbon back to ca. 5000 BC was made possible by the availability of 10 year units of Bristlecone pine tree rings. At the time (1970), the Bristlecone pine, shown in the “window” of the plot, constituted the sole source of dendro-dated wood beyond the range of sequoia and Egyptian material (Ferguson, 1970).

Discovery of the natural variations of radiocarbon (de Vries, 1958) spawned new fields of ^{14}C geophysics. Refined measurements of the secular variations and shorter term fine structure in the plot have been critical to advances in archaeomagnetism, quantitative understanding of the global carbon cycle, and links between solar activity, cosmic ray intensity, and climate.

Credits: The cover illustration is an adaptation of Fig. 5 (p. 191) of the article on the metrological history of radiocarbon dating. The figure derives from Fig. 1 (p. 110) of the Nobel Symposium on *Radiocarbon Variations and Absolute Chronology* (copyright 1970, the Nobel Foundation, used with permission). The photograph of the bristlecone pine was made available by D. J. Donahue, first director of the Accelerator Mass Spectrometry Laboratory at the University of Arizona. Cover art arranged by C. Carey.

References: C. W. Ferguson, Dendrochronology of bristlecone pine, *Pinus aristata*. Establishment of a 7484-year chronology in the White Mountains of eastern-central California, U.S.A., in *Radiocarbon Variations and Absolute Chronology*, I. U. Olsson, ed., Almqvist & Wiksell, Stockholm (1970) pp. 237-259. Hl. de Vries, Variations in concentration of radiocarbon with time and location on earth, Koninklijke Nederlandse Akademie van Wetenschappen, Proc. Ser. B, **61**, 94-102 (1958).

The *Journal of Research of the National Institute of Standards and Technology*, the flagship periodic publication of the national metrology institute of the United States, features advances in metrology and related fields of physical science, engineering, applied mathematics, statistics, biotechnology, and information technology that reflect the scientific and technical programs of the Institute. The *Journal* publishes papers on instrumentation for making accurate measurements, mathematical models of physical phenomena, including computational models, critical data, calibration techniques, well-characterized reference materials, and quality assurance programs that report the results of current NIST work in these areas. Occasionally, a Special Issue of the *Journal* is devoted to papers on a single topic. Also appearing on occasion are review articles and reports on conferences and workshops sponsored in whole or in part by NIST.

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